

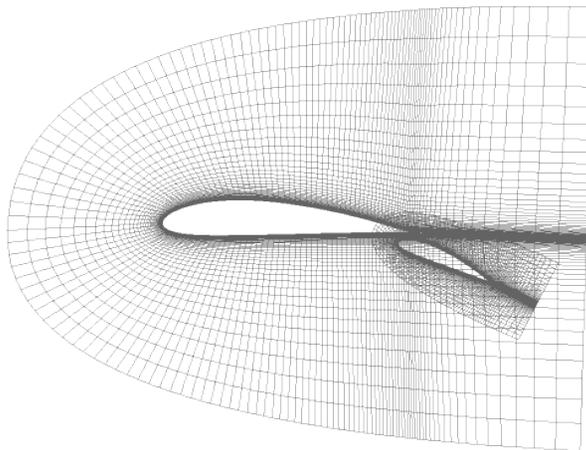
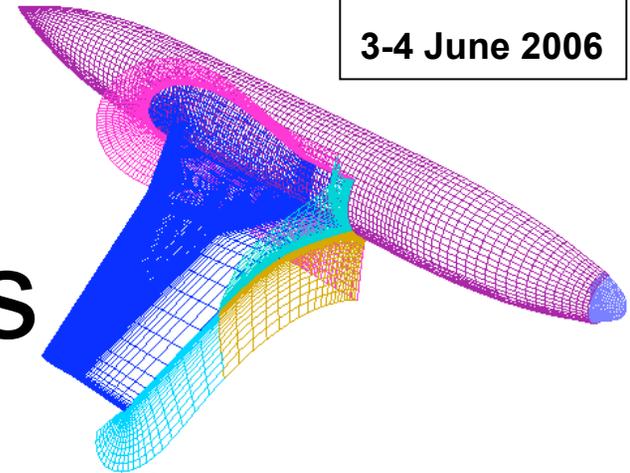
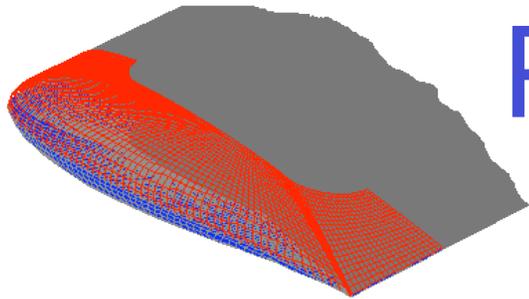
DPW-3
3-4 June 2006

Best

Practices

eXpert for

CFD



Sponsored by NASA Langley Research Center
Contract NAS1-03053



**NIELSEN ENGINEERING
& RESEARCH, INC.**

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Introduction

- Many CFD problems can be traced to inexperienced users producing results with software they do not understand.
- The user has a critical role in current CFD processes.
- Each flow regime may require a special approach to ensure satisfactory results.
- Each CFD algorithm and code may have its own individual requirements and quirks.
- The quality of CFD results is subject to variability of different users and codes.

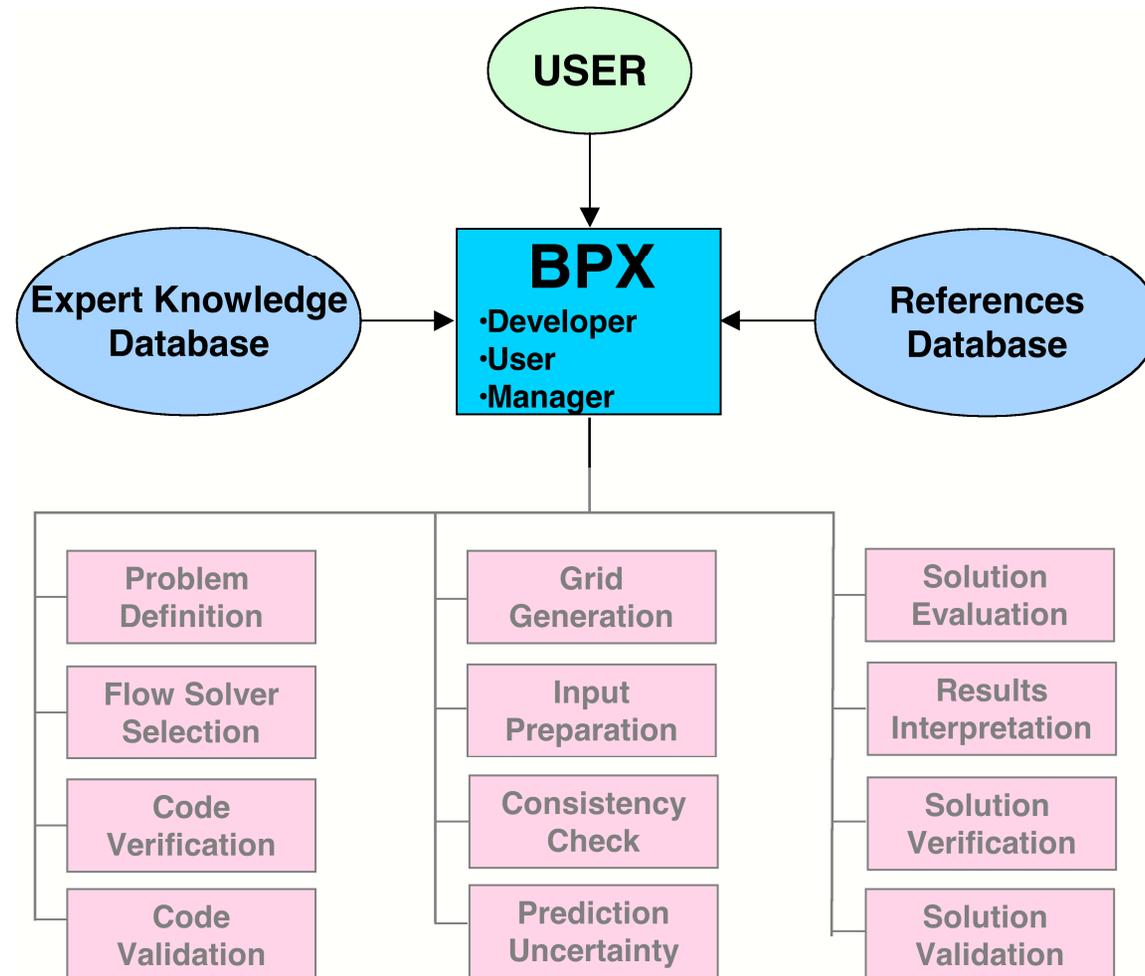


Background

- NASA Langley Research Center Funding
 - April 2003 to August 2006
 - Technical Monitor: Joe Morrison (with M. Hemsch & J. Luckring)
- The Goal of Best Practices for CFD
 - Achieve Consistent High-Quality Solutions
 - Reduce Uncertainty, Minimize Errors, Quantify Uncertainty
 - Produce More Efficient CFD Tools, Lower Cost Analyses
 - Eliminate Unnecessary Runs
 - Don't Repeat the Mistakes of the Past
 - Leverage corporate and expert knowledge
- The Result is **BPX** - Best Practices eXpert for CFD to provide a bridge between the “art” and “science” of CFD



What is BPX?



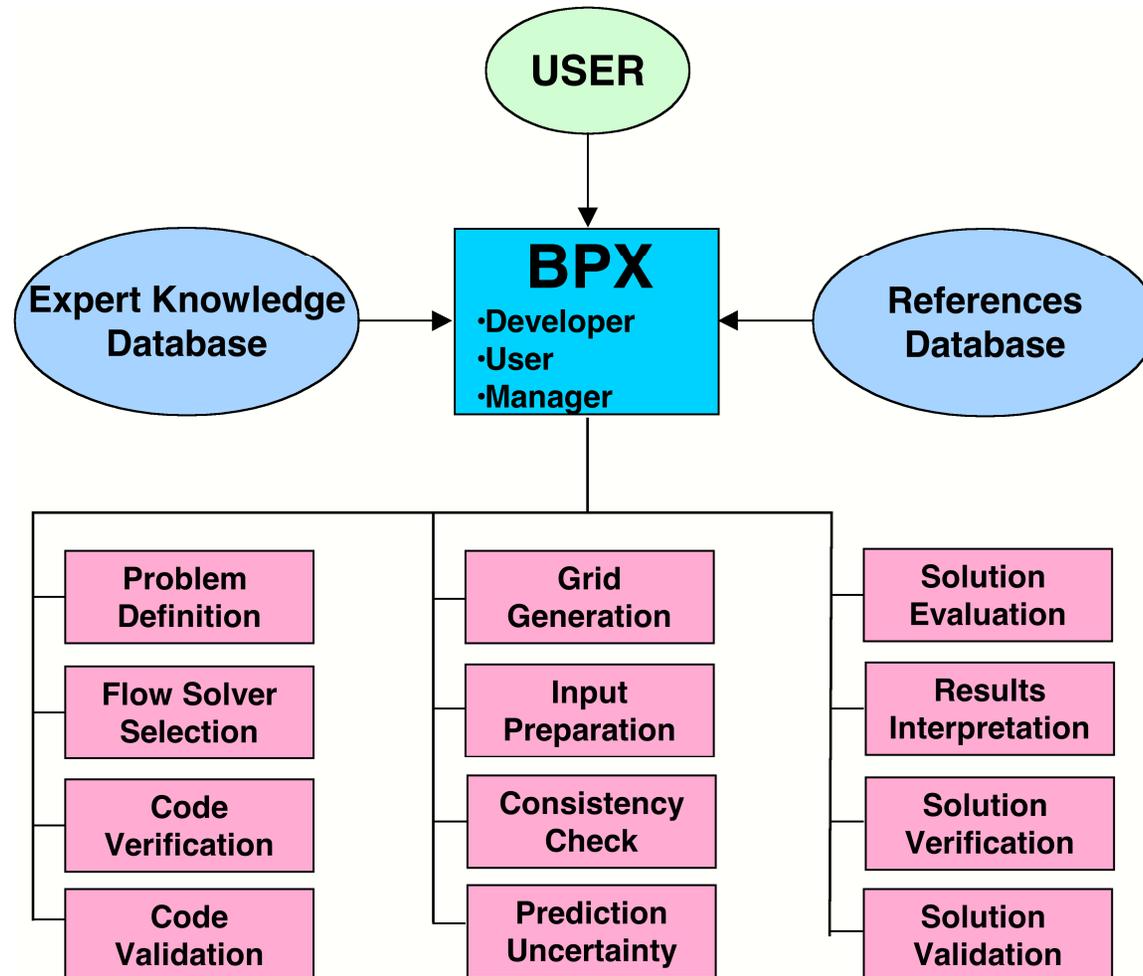


BPX Databases

- BPX is Built on a Knowledge-Based System
 - Expert Knowledge Database
 - Reports and Documents Citations Database
 - Specific Guidelines
 - Rules for Special Situations and Problems
 - Frequently Asked Questions
 - Verification and Validation Information

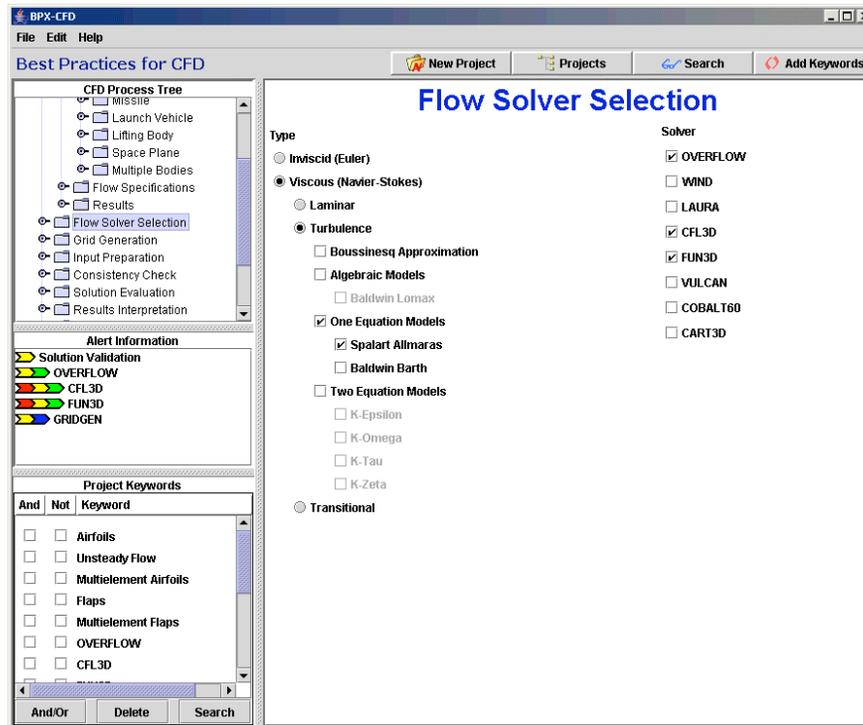


What is BPX?

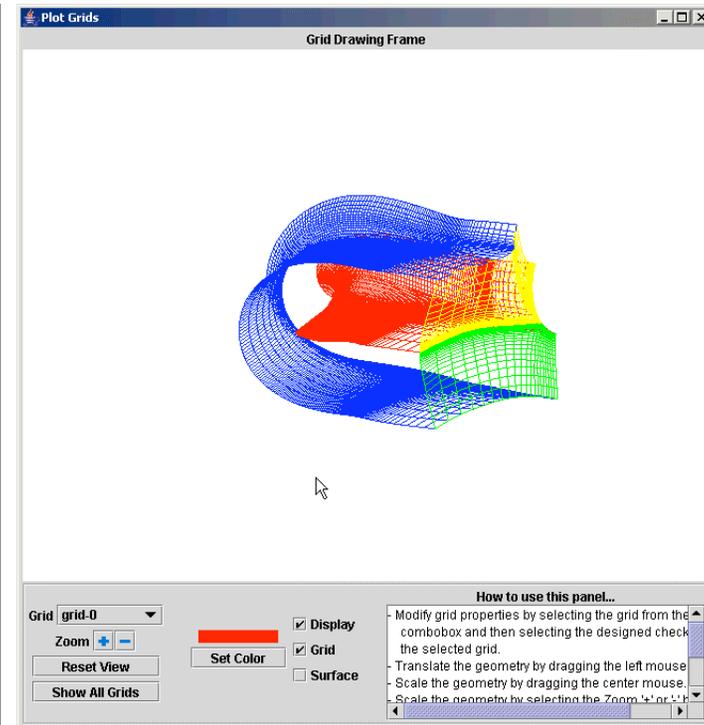




BPX Application



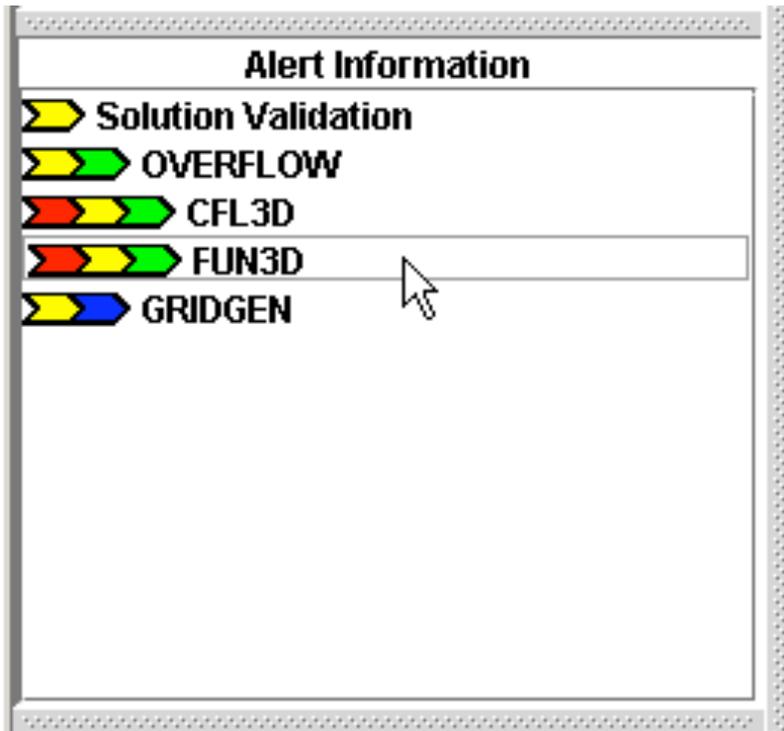
CFD Process



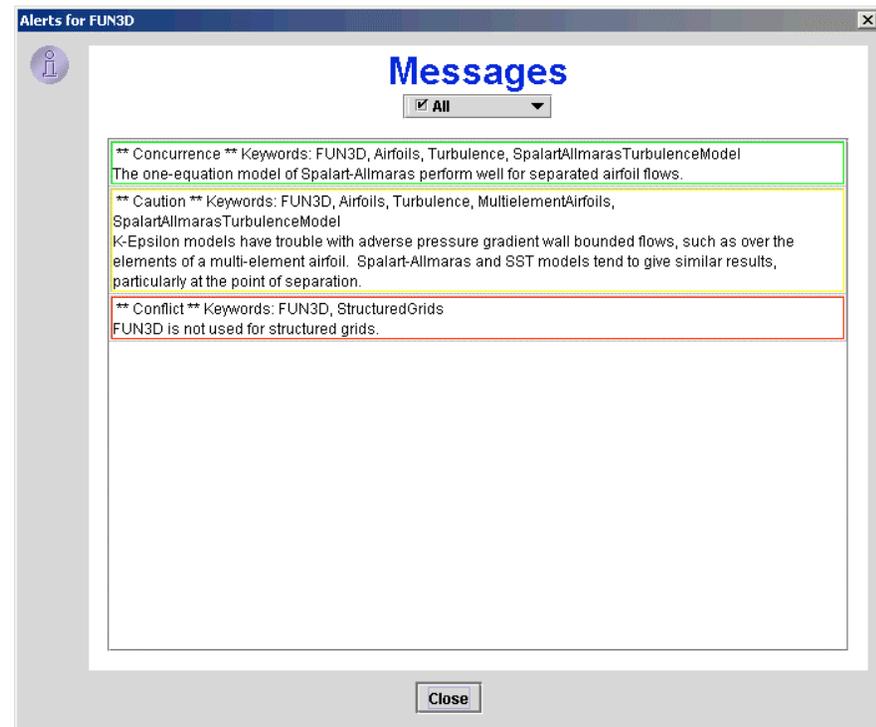
Grid Visualization



BPX Application



Alerts



Guidelines



Why Are We Here?

- You Are the Experts!
- You Have the Knowledge to Make BPX Work!
- We Need Your Help with Knowledge Acquisition!
- How Does the Knowledge Capture Happen?



The Knowledge Capture Process

- Conduct Personal Interviews with CFD Expert Users and Developers, (1+ Hours) Record Audio
 - Personal One-on-One Interviews Work Best
 - Telephone Interviews are Possible
 - Group Interviews are not as Productive as Individual Interviews
- Transcribe Audio Tapes
- Check Transcription with Tapes for Accuracy
- Parse Technical Information from the Transcript
- Assign Keywords from the Hierarchy
- Add Information Nuggets to the Database
- Perform Final Editing and Checking
- Perform Follow-up Interviews if Needed



We Need Your Help

- Contact Information:
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Where Do We Go From Here?

- BPX will be Delivered to LaRC about August 2006.
- NASA will Provide Distribution for the Initial Version of BPX.
- Future Maintenance and Support of BPX is tbd.
- NEAR will Investigate Other Opportunities for BPX.
 - Proprietary Versions
 - Develop Systems for Other Technology Areas